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**CONTINUED NOTES ON A NORTH DORSET COLONY OF THE  
MEADOW BROWN BUTTERFLY *MANIOLA JURTINA* L.**

RUPERT D.G. BARRINGTON

*Old College Arms, Stour Row, Shaftesbury, Dorset.*

TWO previous articles (*Ent. Rec.* 96: 259-263 and 99: 97-102) have discussed variation in an exceptional colony of *M. jurtina* from an area of hay meadow in the Blackmore Vale of North Dorset. The following continues the observations up to the 1989 season and, after nine years of more or less intensive study of the colony, a few conclusions are drawn regarding the extent of variability of this population.

In the last article reference was made to a population study conducted in the area and further details are given below.

**Population census**

The population size was assessed during 1985 using the mark - release - recapture technique (details of method and statistical analysis of raw data are given by Ford, 1951). Windsor & Newton picture varnish was used to mark specimens, a spot being applied to a different area of the wing each day so that the previous date/s of capture of recaptured specimens could be recorded. The technique requires a well confined colony. The accompanying photograph of the area shows that hedges bound the fields on three sides, the fourth side being a garden and buildings.

Fig. 1 shows the change in daily population size through the season and Fig. 2 the changing proportions of the sexes. The graphs show a long trickle of males emerging in late June and a large burst of female emergence in the second week of July coinciding with the population peak on 13th July. From Fig. 1 this peak is very marked as it is when observed in the field (although the peak was some ten days early in 1989).

Analysis of daily population size gave a total of about 13,500 individuals. Certainly on sunny days in 1985 very large numbers of butterflies rose from the grass as one walked through (often after catching the day's random sample of specimens for marking — a small proportion of specimens seen — I would be surprised to find over 100 specimens in my boxes), and this figure is probably not far from the mark. After a series of good summers, 1985 produced the highest population of the species in the nine years of study from 1981 to 1989, although numbers in 1989 may have approached this figure.

Regarding the sex ratios, *jurtina* is well known to be a species that carries the "male first" emergence pattern to an extreme. I have reared a brood in which all males have emerged before the first female, although this pre-female emergence usually seems to be more in the region of 75% of the males. One would imagine that some males might die before having the opportunity to mate. Assessing length of life is difficult, but in the present

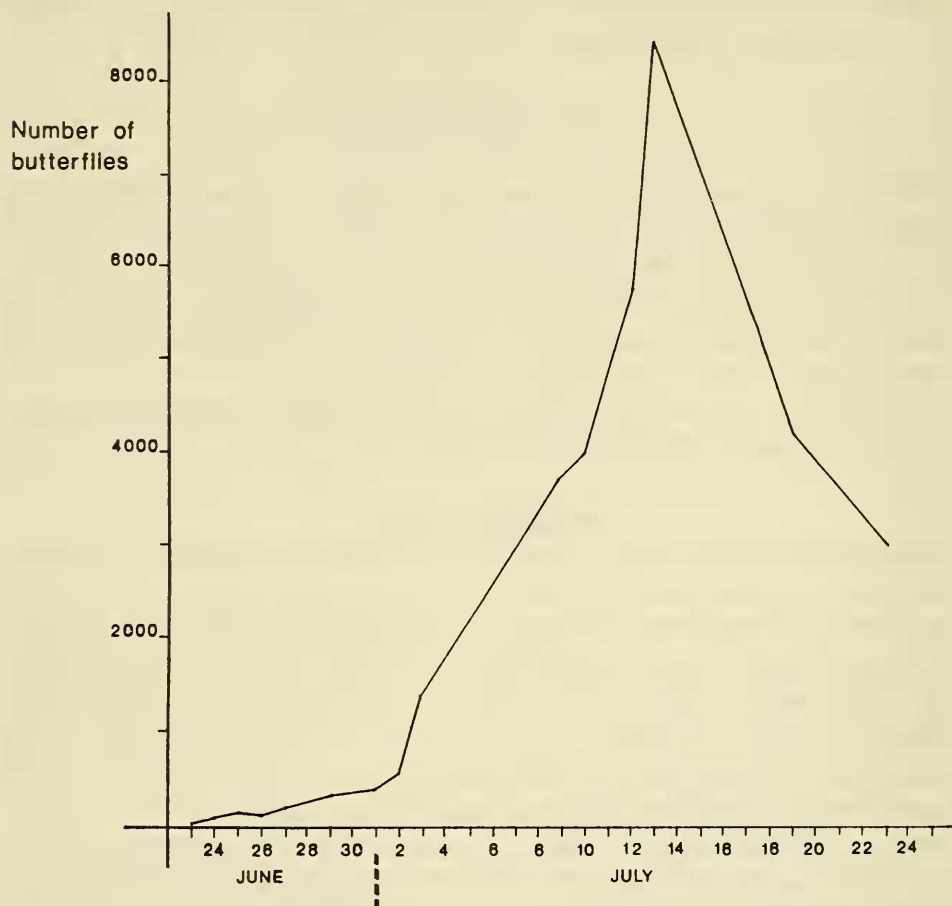


Fig. 1. Population of *Maniola jurtina* in a North Dorset colony during 1985.

study the longest time between initial marking and subsequent recapture of a specimen was 17 days; this for a female. In captive conditions males live for about eight days, so almost certainly some of the earliest males will never meet a female.

#### The seasons of 1986 - 1989

In mid-June 1986 the fields were cut unexpectedly early for hay. At this time the first males are emerging and most of the population would be pupae or large larvae. Cutting at this time must destroy these stages in some numbers, especially with the practise of cropping the grass tight like a lawn (in the breeding cage although some larvae pupate at the base of the grass stems a fair proportion will pupate several inches up the stem and would be vulnerable). However, *jurtina* has remarkable powers of recovery and the population the following year was probably not far below average.

It has sometimes been stated that *jurtina* will rarely cross a hedge. I now feel that this statement needs qualification. Whilst *jurtina* seems to be a

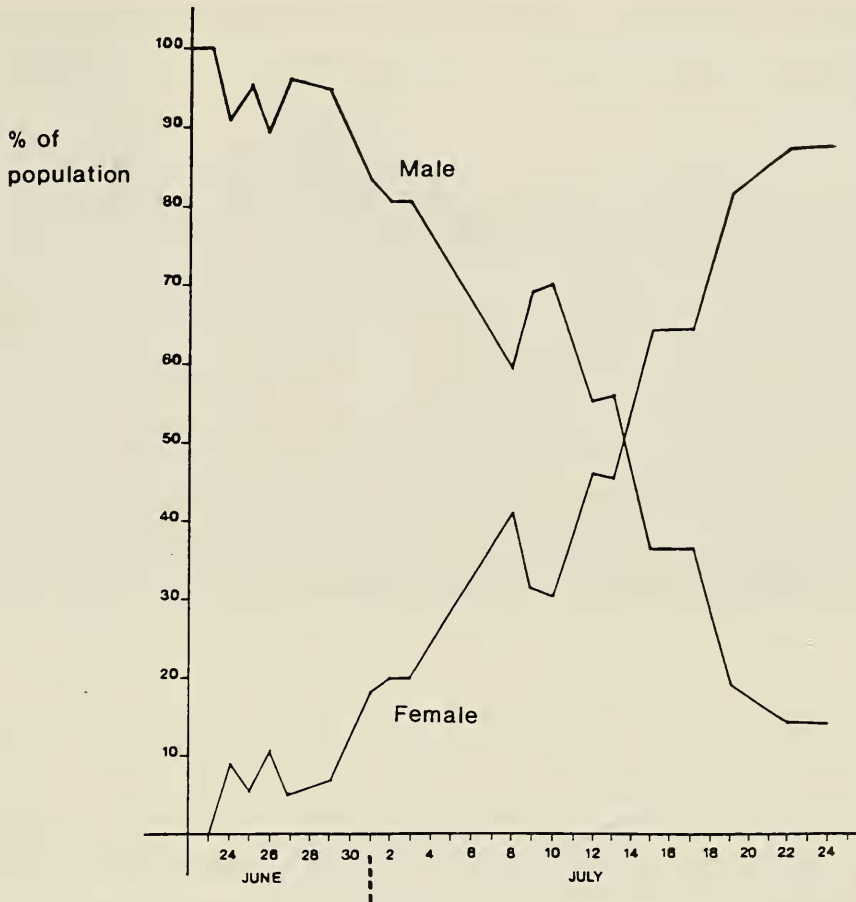


Fig. 2. Male/female distribution of *Maniola jurtina* in a North Dorset colony during 1985.

basically sedentary insect and a hedge will undoubtedly provide some sort of barrier which they will not often cross if conditions in the area are favourable (ie plenty of flowers), when conditions are unfavourable (eg a newly cut field with few flowers) the butterflies become more restless. In this state they are often to be seen crossing hedges to reach new fields where they will lay eggs and search for flowers.

A new area was required in 1986 as our fields would be of no use until the following season. Most of the meadows locally are cut early, but near a woodland half a mile away a beautiful spot was found. Normally well grazed and with *jurtina* sparse, this year grazing had been relaxed with only four Jersey cattle and two horses in the two acre field. The grass was long in parts with dense stands of thistles, and *jurtina* numbers had exploded. The best area was the sloping end of the long, rectangular field backing onto the woods. With the majority of the thistles it was also sheltered but still had the sun until about 6pm. This was the most attractive situation in which I have been fortunate to look for butterflies. The very English scenery of old oak

woodland and meadows in all directions, a few farm buildings and a field lined by huge oaks, maple and hawthorn was augmented by Silver-washed Fritillaries and White Admirals visiting a thistle stand in a damp corner of the field.

I was able to work the area for several days in July and the first aberration, taken on the 3rd, was a female ab. *antiauro lancea* Leeds with the forewing fulvous of the upperside broken into bands by darker scaling. The 10th was a sultry day and the best method of collecting was to stand still in the centre of a large thistle patch and quietly observe the specimens coming in to feed. A fresh male ab. *anticastanea* Leeds was taken in this way. This form has the fulvous of the underside of the forewings of a deep brick-red colour and the wing fringes very pale. The following day was warm with patchy sun, and a strongly marked female ab. *fracta* Zweigt was quickly spotted at rest on the ground. Several hours of further search revealed nothing when, with the shadows of the oak trees beginning to stretch across the thistles bringing an end to the best collecting conditions, I saw a butterfly that, even from 40 feet, was clearly visible as a gynandromorph. It flashed a curiously incomplete area of fulvous as it flew towards me. It proved to be a perfect example, halved on the upperside but with the apical spot on the underside of the male half mainly female. A further *antiauro lancea* female was taken on 13th. In another local field with a fair population of *jurtina* a number of forms were taken over the next two days including a good female *fracta*, a female ab. *addenda* Mousley and a male ab. *postmultifidus* Lipscomb, a form rather indistinct in the male despite being a striking female variety.

1987 and 1988 were disappointing years with seemingly continuous wind and rain during the emergence period, and time was very limited. The only specimens of note from the usual area in 1987 were an asymmetrical female *antiauro lancea* with forewing fulvous reduced on one side, an asymmetrical female *postmultifidus* with two darkened veins across the median band of one hindwing, a female ab. *antiobscura* Leeds with the forewing fulvous dusted over with ground colour and an unusual colour form of the female underside. The closest description to this aberration (of which three female examples have been taken over nine years) that I have come across is that of ab. *antiultrafulvescens* Leeds (Leeds, 1948-9). It is described as having *the forewing basal area of a pronouncedly darker but somewhat brightish-brown colour, occasionally with a reddish tinting*. The present examples are certainly reddish, but additionally the forewing fulvous is restricted to a smaller area by dark scaling, the ground colour is a rich reddish-chocolate and the hindwing median band is of a pure grey with little of the normal flecking of darker scales. I have not seen this form anywhere else and so assume it to be a rare aberration. A more appropriate name may simply be *ultrafulvescens*.

Two dull mornings were available for collecting in 1988. On 10th July, at the point when lethargy was beginning to set in after two or three hours of





Fig. 3. The *jurtina* meadow st Stour Row, Dorset, June 1989.

damp, fruitless effort trying to net the *jurtina* that were shooting past on the strong wind, I scarcely bothered to examine a female on a flower head exhibiting a typical upperside. It turned out to be the most extreme *fracta* I have ever seen. Also an unusual female was taken with the light central hindwing band invading the darker basal area (Fig. 4). One of the few butterflies feeding from knapweed on the 15th was a female with homoeosis on the underside of one hindwing, this consisting of a thick streak of orange scales.

Fine, warm and dry conditions made 1989 a more productive year, advancing the emergence by ten days with the population peak being at the start of July. Numbers were probably up on the previous two years although it was difficult to assess the 1987 and 1988 populations as the adults rarely fed from flowers in any numbers, when it is easiest to observe them.

The first day in the fields was 17th June and there were good numbers of butterflies, mainly male, on the wing, when I would normally expect to see only the first few emergences. Little variation was evident. The following day an interesting observation was made. At 10am, in a part of the field well grazed by a horse, many male *jurtina*, evenly spread over the short grass, were flying low and slowly, landing frequently but not to feed. This is quite different from their normally frenetic flight between flower patches. They appeared to be searching for newly emerged females. Although at this time of year males far outnumber females, the two sexes were feeding from flowers in equal numbers, most males being involved in the searching flight. This phenomenon was only noticeable in the morning,

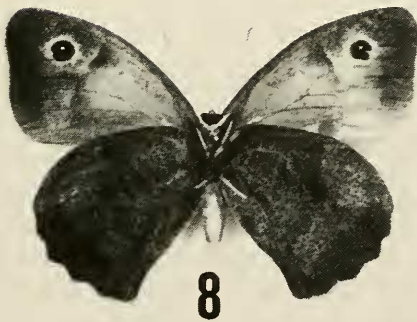
after which presumably, the day's new emergence is almost over. With up to 100 males visible from a standing position this behaviour was quite striking. Once recognised in the short grass it could be seen to be happening over all the area. I have since heard that work in Holland has confirmed this to be mate-searching behaviour. The only aberration of note was a lightly marked male *postmultifidus* from a knapweed head.

Some free time in the week starting 24th June coincided with the only poor weather for weeks or months either side. The 24th produced a male ab. *atrescens* Leeds flying over knapweed, the hindwings being strongly black. A very worn male ab. *subtus* - *albida* Silb. was seen feeding from bramble in the hedge. This was the fifth example of the form (four male, one female) seen in the area over the nine years. The weather was windy and wet until the 28th which, although drizzling was at least still, but cold. The only *jurtina* seen were those kicked out of the grass, which were examined until the net became so wet that I risked damaging any captures. A fresh female ab. *fracta* was taken.

In previous years I have seen *jurtina* captured on the wing by the swallows that breed in some old stables at one end of the fields. On this cold day, after an hour of looking at the browns, I was surprised by a swallow that swept past no more than four feet away to capture a *jurtina* I had just disturbed from the grass. This bird returned every few minutes (doubtless having fed a chick) continually taking butterflies almost in front of my nose. Half an hour later another swallow twigged on to this unexpected bonus and did the same. It was a rare privilege to see, at such close quarters, their aerial acrobatics. If they missed a specimen first time around they would turn at an acute angle with little loss of speed and come back for it. I saw few butterflies escape and one wonders how much use the deflective apical spots can be against such an adversary. On hot days when *jurtina* are flying of their own accord, five or more swallows may be seen racing over the grass and flowers. Their chicks must be raised on a diet high in Meadow Browns.

The 30th was, at last, a fine day and *jurtina* were up and feeding in good numbers. They were best worked by walking slowly from one flower patch to another using the net only to examine something that looked unusual. This is an easy method except that *jurtina* appears to have a sense of hearing. Some moths are known to have hearing structures but their existence in butterflies is less well known. When near a patch of flowers covered in feeding *jurtina* a slight movement of a foot (invisible to the butterflies) may cause a trapped grass stem to snap audibly, and most butterflies will immediately take off. The hearing sense of a moth is, at least partly, related to the need to hear approaching bats, but its use is less clear in butterflies.

A good female ab. *crassipuncta-addenda* Leeds (Fig. 5) was taken with the apical spot considerably larger on the upper than underside, and a female with a black suffused patch on the underside of one hindwing (Fig. 6). This appears to be a partial expression of *atrescens* (a similar specimen



Figs. 4 - 9. Aberrations of *Maniola jurtina* L. 4. Female with reduced hindwing basal area, Stour Row, Dorset, 10.7.1988 (RDGB). 5. Female *crassipuncta-addenda* Leeds, Stour Row, 30.6.1989. (RDGB). 6. Female with partial expression of *atrescens* Leeds. Stour Row, 30.6.1989 (RDGB). 7. Male, unnamed aberration, Gomshall, Surrey, 28.8.1944 (J.C.B. Craske). 8. Female *atrescens* Leeds. Stour Row, 2.7.1989 (RDGB). 9. Female showing homoeosis, Stour Row, 8.7.1989 (RDGB).

taken by J.C.B. Craske in 1944 is illustrated for comparison (Fig. 7) — this does not seem to be an expression of *atrescens* but may be a form of homoeosis or some other very unusual unevenly patterned aberration). Just how *atrescens* is inherited is not clear but it has some lethal effect, and captured specimens almost invariably exhibit some degree of wing



deformation (of the 12 or so specimens exhibiting melanism that have been seen in this locality, only one was without any deformity). I have found specimens with one side or one wing more blackened than the others (such insects have usually been very badly deformed), although the distinct black patch of this specimen is a form I have not had before. The upperside of the present specimen is of a washed-out grey-black with reduced forewing fulvous, characteristic of all the female *atrescens* I have seen and there is a small deformity in the black area, so there seems little doubt that this insect shows an unusual expression of the *atrescens* complex. Another female taken in flight was transitional to *atrescens* but with crumpled wings. She laid a few ova but no larvae have survived. A male ab. *sinis-anommata* Vty, and a female transitional to *fracta* were observed.

A warm day on 2nd July produced an extreme female homoeotic form with orange streaks over half of the underside of one hindwing. This is almost certain to be an inherited aberration (five such examples have been taken, all showing orange streaks on the underside of the left hindwing). The 8th July was the last day I was able to work the area. Conditions were perfect and butterflies very abundant. In a two hour search several aberrations were found including a good female *atrescens* (with a small "shot-hole" in one forewing) (Fig. 8), a female *antiobscura* with virtually no upperside fulvous, a well marked female *addenda* and a female showing hindwing homoeosis with brown streaks on the underside of one hindwing (Fig. 9).

### Some conclusions

Almost every form of variation known in *jurtina* has occurred in the hay meadows of this area of North Dorset. This includes spotting variation with extra spots on all wings and both surfaces, reduced, absent or enlarged apical spots (the specimens referable to ab. *crassipuncta* Leeds that have been taken are not extreme and other areas are known to produce more striking examples). Ground colour forms have varied from creamy through a range of insects paler and darker than type to the heavily melanic *atrescens*. The forewing fulvous varies from white to a reddish-brown and in extent on the upperside of the female from extensive with a hindwing band to total absence. The hindwing "banded" aberrations with darkened veins across the median band of the underside occur as two forms: *fracta* with a single heavy band, and *postmultifidus* with several, but lighter, bands (they do not appear to be related). The aberration *postaurolancea* Leeds with all veins darkened (Russwurm, 1978, pl.39, Figs. 7 and 8 as opposed to Fig. 6 which has since been separated and named *postmultifidus*) has not been found. To my knowledge it has only ever been seen in two downland localities, in one of which it is now a great rarity. I have no information on the other area. Homoeotics and a gynandromorph have been taken, and the whole range of bleached ab. *partimtransformis* Leeds.

The only major aberrant form that has not been found is albinism. There



are three albino types: white, grey and "gold". All three have sometimes been found as recurrent forms. Having not found any in the hay meadows after nine years I would be surprised now to do to as it is likely that the necessary aberrant genes simply do not exist in the population.

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#### Hazards of butterfly collecting — Yemen, 1981.

It is an acknowledged, world-wide hazard of butterfly collecting that it is often difficult to make local people understand why one is engaging in such an activity. Only in places where money is being made from butterflies is it possible to escape questions on the subject, and the questions are usually at their most intense where one's familiarity with the language is weakest.

I was therefore very happy to visit a remote hot spring in Yemen in the company of an American friend whose mastery of Arabic much surpassed mine. He had long wished to swim in the covered baths with hot, sulphurous water. They had been used by generations of the Imams who had kept Yemen isolated till the revolution of 1961. We were well received by a group of men at the usual soft drink store, and as so often in Yemen the drinks were on the house. The genuine hospitality and courtesy of rural folk in Yemen was not changed by the revolution. After the necessary pleasantries, my friend descended to swim in the ancient, dungeon like building. I elected to check for butterflies first and to swim later. There was good butterfly collecting to be had. It was in one of those places in Yemen where many African and endemic species are found that do not occur elsewhere in Arabia.

Three hours later I approached the bath house, waving to my friend and his new found Yemeni entourage. The result was somewhat unexpected — the unmistakable sound of Kalashnikov rifles being cocked. I smartly altered course, waved, smiled and approached the group. I had almost blundered into a very dangerous situation. It was now women's bath-time, and Yemeni men guard their women well. Had I opened the door, that would have been it. But there were no hard feelings — an excusable error of judgement, fortunately stopped in time.

What was I doing with this thing (my butterfly net)? I seized on the opportunity of having a good translator on hand to expound on the marvels of the Yemeni butterfly fauna and its extremely interesting zoogeographical